REMARKS

Claims 1, 2, 4 and 6-8 are pending in the application and are presented for reconsideration.

Applicants note with appreciation for the personal Examiner Interview conducted on July 12, 2000 between the Examiner and applicants' representative, Mr. Kenneth Vu. Even though an agreement was not reached, the Examiner indicated that he would reconsider the 35 USC 103(a) rejection if the argument that "the plasma injection of Suzuki is not the same as the sintering of Mase or [applicants'] and the resulting product is different" is demonstrated as factual and not just an assertion. See Interview Summary.

Claims 1, 2, 4 and 6 were rejected under 35 USC 112, 2nd paragraph, as being indefinite. This rejection is respectfully traversed in light of the above amendments to overcome the rejection.

Claims 1, 2, 4, and 6 were rejected under 35 USC 103(a) as being unpatentable over Mase et al. '456 in view of Suzuki et al. This rejection is respectfully traversed in light of the above amendments, the Examiner Interview, and the following discussion.

The Examiner argues that applicants' claims differ from Mase by calling for the boundary layers to have a sintered particle size larger than those of the electrolyte and insulating layers. The Examiner contends, however, that Suzuki discloses forming a more porous layer by starting with larger particles than a neighboring layer, and that it would have been obvious to combine Mase and Suzuki to attain the claimed invention. Applicants respectfully submit that there is no motivation or suggestion to combine Mase and Suzuki because the resulting air-fuel

ratio sensor would be different from that of the claimed invention. In particular, the porous coating layer of Suzuki operates to protect the electrode of the oxygen sensor by providing the porous coating layer thereon and to prevent the electrode from being exposed to the exhaust gas. Thus, the porous coating layer of Suzuki must be located on an outer surface of the oxygen sensor. In other words, Suzuki's disclosure prevents the porous coating layer from being an inside layer interposed between two substrate layers like the claimed invention.

Furthermore, neither Mase nor Suzuki discloses or suggests a boundary layer having a sintered particle size larger than that of the solid electrolytic substrate layer or the insulating substrate layer so as to suppress the occurrences of cracks in the boundary layer in a multilayered structure. Instead, Suzuki's porous layer operates to trap poisonous materials. Accordingly, applicants respectfully submit that one of ordinary skill in the art at the time of the invention would not have any motivation to combine Mase and Suzuki to attain the claimed invention, nor is there any suggestion to combine the cited prior art.

As stated above, the Examiner indicated that he would reconsider the 35 USC 103 rejection if the argument that "the plasma injection of Suzuki is not the same as the sintering of Mase or [applicants'] and the resulting product is different" is demonstrated as being factual and not just an assertion. Specifically, the Examiner wants applicants to demonstrate, for example, by textbook data or lab data that no specific correlation is found between the size of sintered particles and the obtained porosity of the sintered body. The porosity is rather influenced by the purity or fineness of the materials. For example, when the particle size is uniform (even if an average particle size is large), an obtained sintered body has a relatively low porosity. On the other hand, when the particle size is non-uniform (even if an

average particle size is small), an obtained sintered body has a relatively high porosity. Applicants hereby present a copy of a published article "High Purity/Fine Alumina" of Sumitomo Chemical Co., Ltd., which demonstrates that porosity is not always proportional to size of a sintered particle.

As claim 1 recites, one of the features of the invention is that the boundary layer has a sintered particle size larger than that of the solid electrolytic substrate layer or the insulating substrate layer. An effect of providing the boundary layer having a larger sintered particle size is to make the boundary layer act as a buffer for absorbing the thermal or mechanical stresses. Growth of small cracks is thus effectively prevented by the boundary layer. As a result, the strength of the multilayered air-fuel ratio sensor is enhanced.

Neither of the cited prior art discloses or suggests the sintered particle size of the claimed invention.

Referring to page 2 of the attached article, an original "AKP-3000" has a particle size smaller than that of an original "AKP-20" (see graph illustrating the relationship between Particle Size (ųm) and Cumulative Mass Percent (wt%)). According to the Examiner's contention, the porosity of the sintered "AKP-3000" should be lower than that of the sintered "AKP-20" since the Examiner contends that porosity is dependent on particle size. However, the graph illustrating the relationship between Firing Temperature and Fired Density demonstrates that the density of the sintered "AKP-300" is lower than that of the sintered "AKP-20." It is known in the art that when density is lower, porosity is higher. Thus, from the graphs of the attached article, it is understood that "AKP-300" has a higher porosity than that of "AKP-20" in contrary to the Examiner's contention. In other words, smaller particle

size does not assure higher density, and this is why porosity is dependent on the purity or fineness of materials rather than particle size (see Table of article).

In sum, applicants respectfully submit that neither of the cited prior art discloses or suggests claims 1, 2, 4 and 6, and that these claims are patentable over the cited prior art. Accordingly, applicants request withdrawal of the rejection of claims 1, 2, 4 and 6 under 35 USC 103(a).

Applicants have addressed all of the Examiner's rejections and respectfully submit that the present invention is in condition for allowance.

Respectfully submitted,

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